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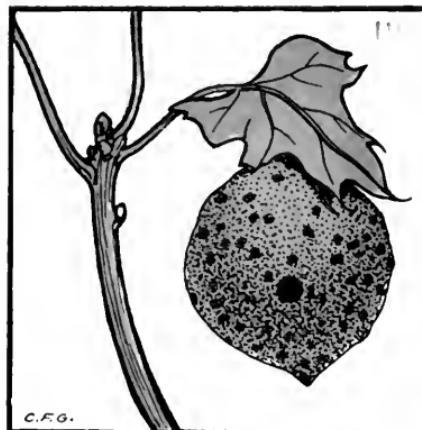
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FIFTY COMMON PLANT GALLS OF THE CHICAGO AREA

BY
CARL F. GRONEMANN



BOTANY
LEAFLET 16

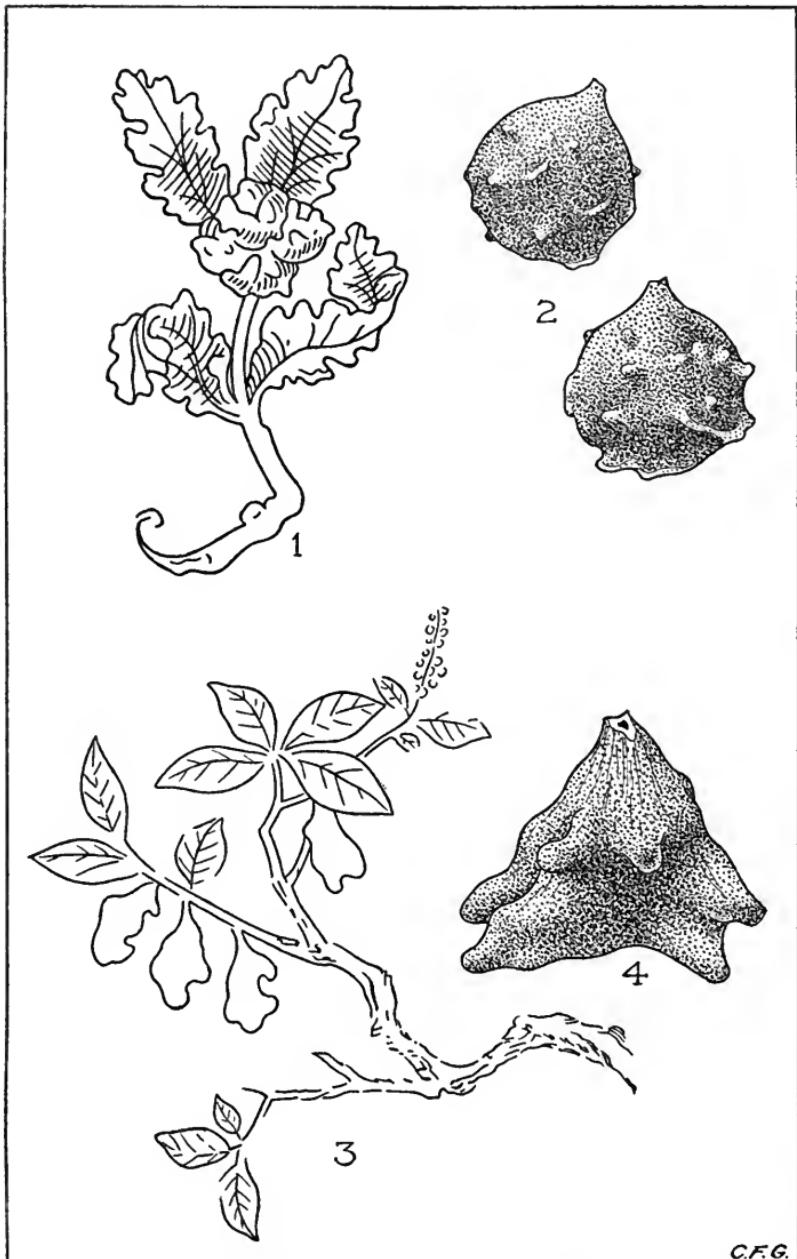
FIELD MUSEUM OF NATURAL HISTORY
CHICAGO
1930

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STEPHEN C. SIMMS, DIRECTOR

FIELD MUSEUM OF NATURAL HISTORY
CHICAGO, U. S. A.



C.F.G.

TWO EARLY KNOWN PLANT GALLS

1. The Aleppo gall, *Cynips tinctoria*, as represented in *Hortus sanitatis*, 1491. Believed to be the oldest illustration of a gall.
2. Original illustration of the Aleppo gall, *Cynips tinctoria*.
3. Illustration of the Chinese gall, *Schlechtendalia chinensis*, from the Chinese Materia Medica, *Pen ts'ao kang mu*, about 1590.
4. Original illustration of the Chinese gall, *Schlechtendalia chinensis*.

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FIELD MUSEUM OF NATURAL HISTORY

DEPARTMENT OF BOTANY

CHICAGO, 1930

LEAFLET NUMBER 16

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Fifty Common Plant Galls of the Chicago Area¹

The curious swellings and bizarre formations called galls, which appear on plants, scarcely ever fail to attract attention, and their presence is often the cause of much speculation. Galls have long been known to exist, and we find mention of them in the literature of such early writers as Theophrastus (371-286 B.C.). Their origin, however, was unknown until comparatively recent times. For centuries it was believed that they were supernatural growths. In the Middle Ages the notion was prevalent that they might be consulted as omens, to foretell future events. It was thus believed that a gall containing an ant augured a bountiful harvest; a maggot, a plague among cattle; a spider, pestilence. Superstition associated with galls still prevails, at least in a small measure, in some countries.

Early investigators were little concerned about the origin of galls. Apparently their interest was more in the practical value of them, particularly as a source of remedies for human ailments.

The gall which has long held a foremost place in the practice of medicine, in tanning, dyeing, and in the making of ink, is the Aleppo gall (frontispiece), an oak gall found in Europe and Asia. An astringent decoction made from

¹ Within fifty miles of the center of Chicago.

this gall was used in the treatment of ulcerated mouth, gum affections, burns, etc. Toothache was allayed by chewing the gall. While the use of the Aleppo gall for medicinal purposes has waned, it is still used extensively in tanning and dyeing and as an ingredient in the manufacture of writing fluids.

Another gall, equally important and also used in medicine, tanning, and dyeing, is the Chinese gall (frontispiece), a sumac gall found in India, China, and Japan. The Bedeguar gall, a rose gall (p. 23), has long been used medicinally and as a charm to induce sleep. The use of galls as a basis for a dye employed in tattooing is recorded by Burton in *First Foot-steps in East Africa*, 1856. He found Somali women using them for that purpose. Thus we find that certain galls have had a wide range of usefulness, both real and assumed.

The Italian physician Marcello Malpighi (1628-94) was the earliest writer on galls to treat the subject systematically, and it is he whom we must credit with the founding of this branch of the natural sciences, called Cecidology. Malpighi, finding that the galls under his observation were caused by insects, removed much doubt as to their origin.

Although thousands of galls have been described from the United States, it is safe to say that there are thousands left to be discovered. To find galls one need not travel far. Often near-by woods, fields, and roadsides offer abundant material. Even the limited area of a city lot may not be entirely void of the plant deformations, for occasionally they are found on weeds and cultivated plants.

Galls possess many interesting characters which tend to make them attractive study material. These features are, in the main, size, shape, texture, and a wide range of color—shades of green, yellow, brown, red, and white.

Plant galls caused by insects are due to a stimulus or irritation produced by them. The host plant responds to the action of this stimulus, which may be chemical or mechanical, by cell enlargement, new cells or both, thus giving rise to these abnormal growths.

It was believed at one time that galls, particularly those caused by gall-wasps, resulted from a poison injected into the plant tissues by the insect at the time of depositing its egg. It is now generally conceded that gall formation does not usually occur until the larva has emerged from the egg. In the case of some galls caused by saw-flies, however, the galls commence to form before the larvae hatch.

Not all galls are caused by insects. Some are due to the presence of eel-worms and still others to fungi, of which the cedar apple on the leaves of the red cedar is an outstanding example.

The galls described in this leaflet are caused by members of the following orders of insects and their allies, the mites:

Hemiptera (Aphididae and Psyllidae). Plant lice and jumping plant lice.

Coleoptera (Cerambycidae). Longicorn beetles.

Lepidoptera (Gelechiidae). Moths.

Hymenoptera (Cynipidae and Tenthredinidae). Gall-wasps and saw-flies.

Diptera (Itonididae and Trypetidae). Midges and peacock flies.

Acarina (Eriophyidae). Mites.

Birds, also, have an interest in galls because they are a source of a large part of their food supply. Chickadees and goldfinches search the willow cone gall for grasshopper

eggs often deposited there. Upon examining a willow cone gall which had previously been searched by a chickadee, 103 grasshopper eggs were found. Woodpeckers and blue jays break open the oak bullet gall (p. 15) to get the gall insect. Squirrels search aphid galls like the petiole galls and the vagabond poplar gall (pp. 6, 7) for the honey-dew secreted by the gall makers, and also open the oak bullet gall to eat the insect.

Among insects attracted by the saccharine fluid exuding from some galls, upon which they feed, are ants, beetles, and wasps.¹

Small spiders inhabit empty galls such as the succulent oak gall (p. 17), and the mason bee is known to build in the large empty oak apple (p. 10).

Galls may be preserved by pressing and mounting like herbarium specimens, or they may be kept in a 2 per cent solution of formalin or a 50 per cent solution of alcohol. Hard, woody galls may be kept in pasteboard boxes.

For other literature on the subject the reader is referred to the list of references at the end of this leaflet.

In the descriptions of the various galls the name of the gall is in each case followed by the scientific name of the insect concerned in its production.

¹See *Transactions, Ill. State Academy of Science*, 1926, p. 195.

PINE-CONE WILLOW GALL

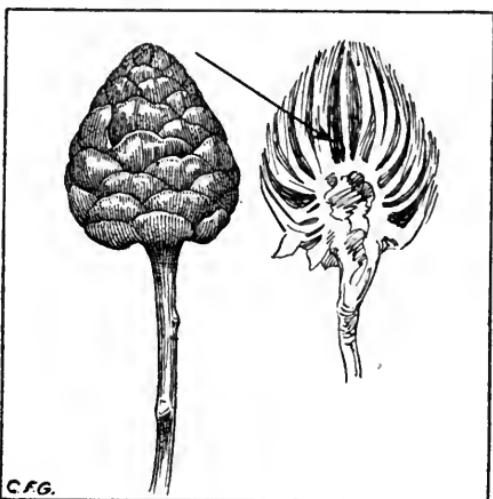
Rhabdophaga strobilooides (Walsh)

MIDGE

In this gall deformed leaves overlap each other, thus forming a scaly cone located terminally on twigs of the willows.

Slightly pubescent and light gray in color.

Arrow points to larval chamber.



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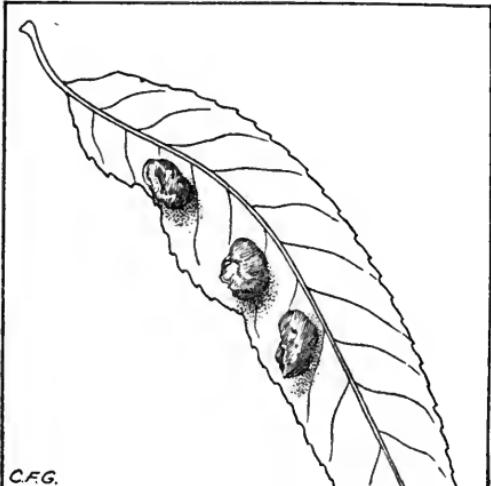
WILLOW LEAF GALL

Pontania desmodioides (Walsh)

SAW-FLY

This smooth- or rough-surfaced gall appears on both sides of the leaf and frequently at the leaf margin. Occurs singly and in numbers to involve almost the entire leaf.

Color: yellow-green, often tinged red.



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WILLOW APPLE GALL

Pontania pomum (Walsh)

SAW-FLY

This spherical, fleshy gall occurs on the leaves of the willows.

The major portion is on the under side of the leaf, projecting but slightly above.

Color: yellow-green, rosy-cheeked, with numerous small brown spots.

A

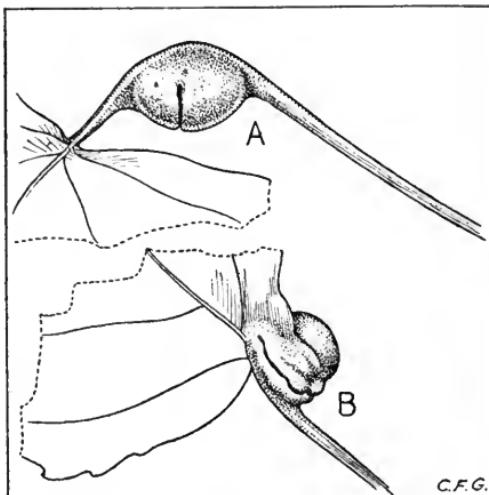
POPLAR PETIOLE GALL

Pemphigus populitransversus (Riley)

PLANT LOUSE

This oval gall, common on the cottonwood, *Populus deltoides*, occurs about midway on one side of the petiole with a transverse slit on the opposite side.

Color: green, often tinged red.



B

POPLAR STEM GALL

Pemphigus populiniculis (Fitch) PLANT LOUSE

This gall, also common on the cottonwood, is located at junction of petiole and blade. Opening at base slightly twisted.

Color: like preceding.

VAGABOND POPLAR GALL

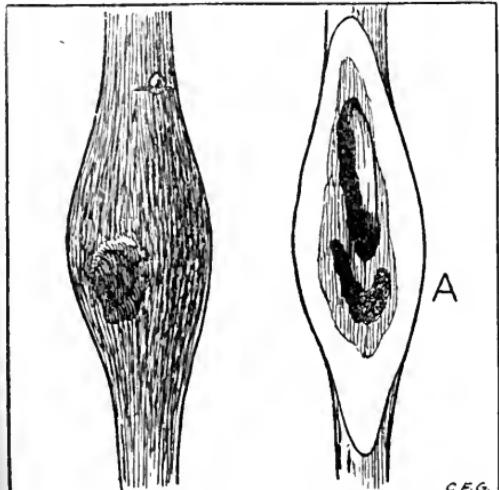
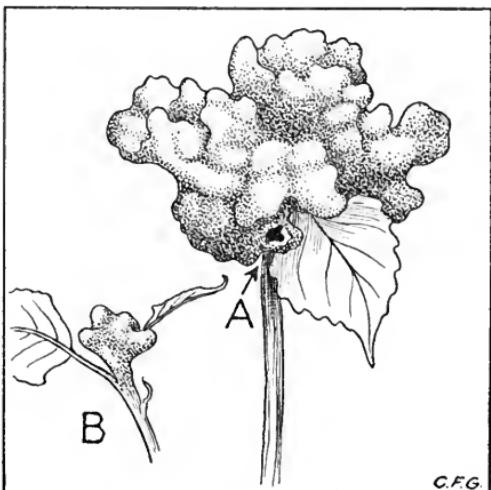
Pemphigus vagabundus (Walsh)

PLANT LOUSE

This apical gall is a deformation of the leaves and is common on the cottonwood. It is hollow with an exit near the base as shown at A.

B represents a young gall.

Color: yellow-green, sometimes tinged red.



POPLAR TWIG GALL

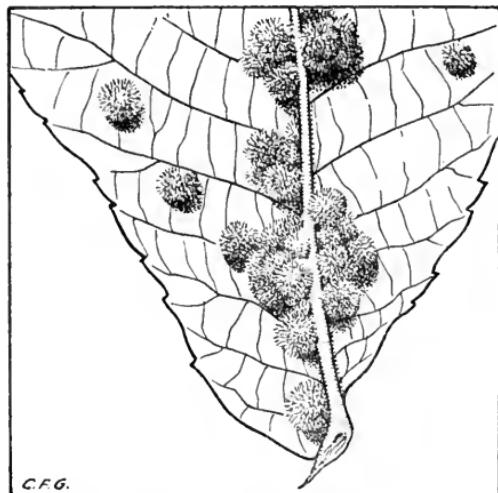
Saperda concolor (Lec.)

LONGICORN BEETLE

This irregular, elliptical twig gall occurs on both willows and poplars and varies in diameter from one to three centimeters.

Section of gall shown at A.

Color: same as twig.



HICKORY ONION GALL

Caryomyia holotricha (O. S.)

MIDGE

This very hairy gall occurs singly or closely massed on the under side of the leaves of several kinds of hickories.

Color: pale when young, turning to rust-brown.

A

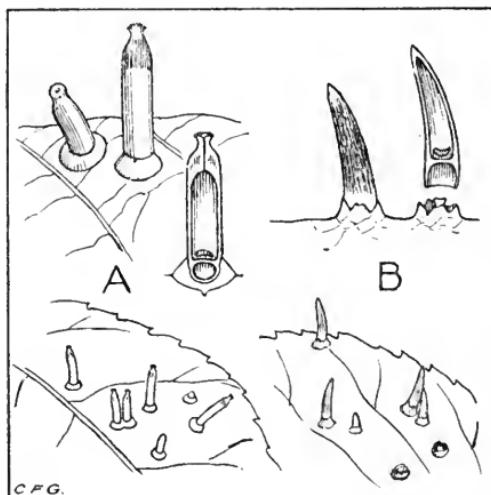
HICKORY TUBE GALL

Caryomyia tubicola (O. S.)

MIDGE

A small cylindrical gall occurring on the under side of hickory leaves. Constricted near the top. Apex slightly flaring.

Color: young gall yellow-green, red near top, apex brown. Dark brown when old.



B

Cecidomyia sp.

MIDGE

This curved, tapering gall, slightly longer than the preceding, also occurs on the under side of hickory leaves.

Color: green turning to dark brown. Lighter at base and apex.

Above (A and B), enlarged galls. Below, natural size.

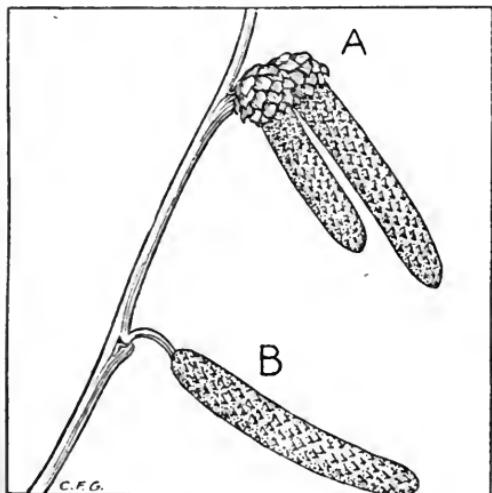
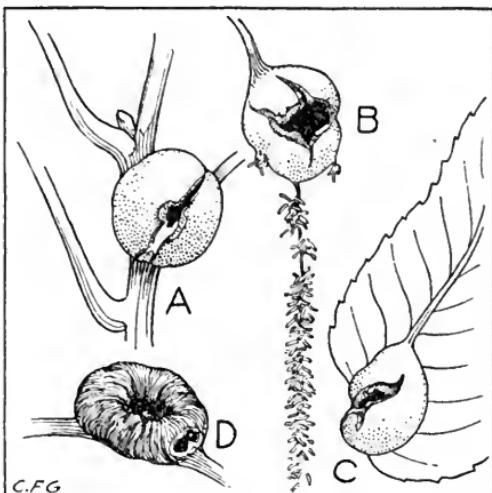
HICKORY APHID GALL*Phylloxera caryaecaulis* (Fitch)**PLANT LOUSE**

This hemispherical, hollow gall is among the largest found on hickories. It occurs on twigs, petioles, midribs and catkins.

Opening at the top which gradually enlarges, the gall finally becoming cup-shaped as at **D**.

Color: green, sometimes tinged red.

A, on twig. **B**, on catkin. **C**, on midrib. **D**, on petiole, old and dry.

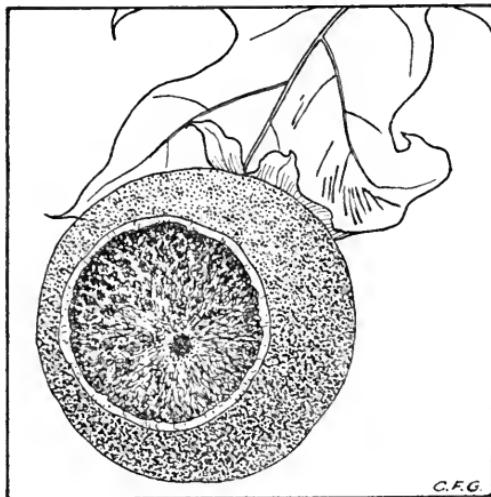
**HAZEL CATKIN GALL***Cecidomyia squamulicola* (Stebb.)**MIDGE**

This gall is a deformation of the scales of the hazel catkin which have increased in size at the base.

Color: same as catkin.

Galls at **A**.

Normal catkin at **B**.



LARGE SPONGY OAK APPLE

Amphibolips spongifica (O. S.)
GALL-WASP

A large, thin-walled, globose gall filled with a white spongy substance in the center of which is the larval cell.

This gall occurs on the leaves of the black oak, *Quercus velutina*.

Color: green, turning to light brown.

LARGE EMPTY OAK APPLE

Amphibolips inanis (O. S.)
GALL-WASP

In general outward appearance this gall is like the preceding but is thinner walled. The larval cell is supported by radiating filaments.

Occurs on the leaves of the red oak, *Quercus borealis* var. *maxima*.

Color: green, with purplish spots.

Another empty oak gall, *Amphibolips cookii* (Gill.) is represented on the cover of this publication.

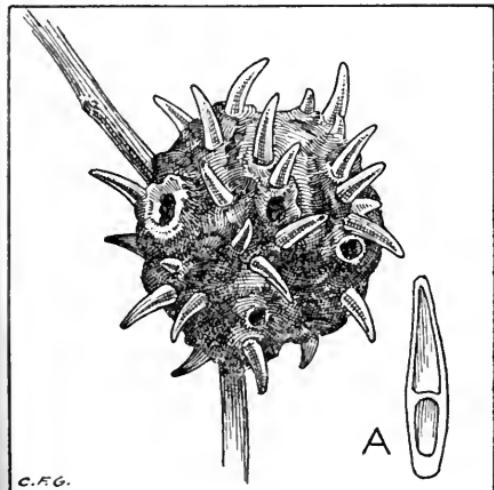
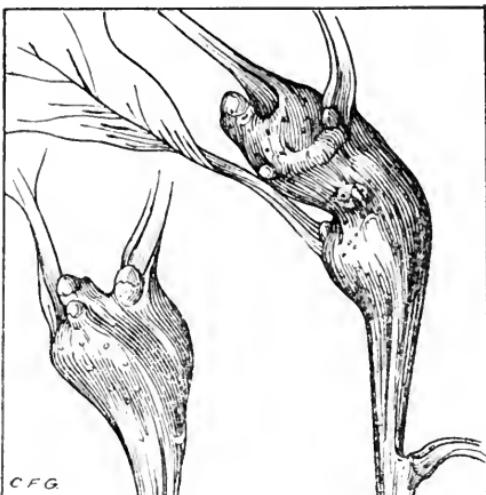


OAK CLUB GALL*Callirhytis clavula* (O. S.)**GALL-WASP**

A hard, woody, club-shaped gall, which occurs on the tips of twigs of the white oak, *Quercus alba*. Leaves frequently grow from it.

Contains several larval chambers.

Color: green, often tinged red, turning brown.

**HORNED OAK GALL***Callirhytis cornigera* (O. S.)**GALL-WASP**

This irregular spherical gall with its hornlike projections, each of which contains a larval cell, occurs on twigs of red oak, *Quercus borealis* var. *maxima*. It is hard and woody and variable in size.

Color: like twig.

A: section of enlarged larval cell.



OAK ROSETTE GALL

Andricus frondosa (Bass.)

GALL-WASP

This gall is a deformed leaf bud which has developed into a crowded mass of modified leaves.

Occurs on the burr oak, *Quercus macrocarpa*, and the white oak, *Q. alba*.

Color: green.

OAK PETIOLE GALL

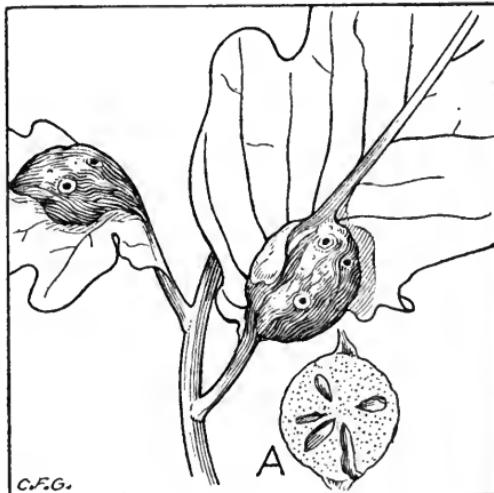
Andricus petiolicola (Bass.)

GALL-WASP

This globose, slightly spindle-shaped gall occurs at the base of the midrib of the leaves of the burr oak, *Quercus macrocarpa*, white oak, *Q. alba*, and swamp white oak, *Q. bicolor*.

Contains several larval chambers as shown at A.

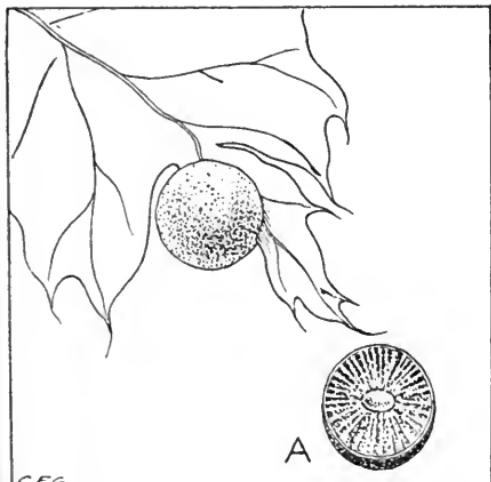
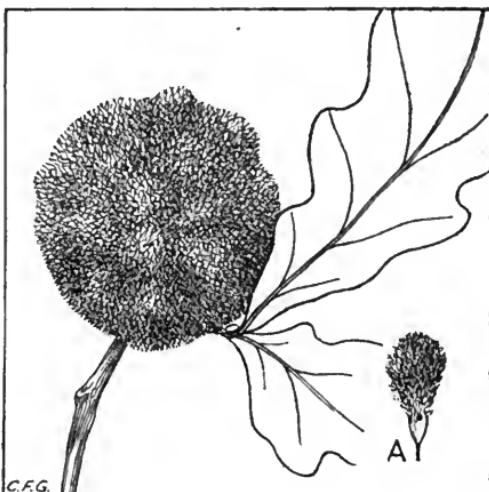
Color: green, turning brown.



WOOL SOWER GALL*Callirhytis seminator* (Harr.)**GALL-WASP**

The wool sower is composed of a large number of small hairy galls attached to a common point on twigs of the white oak, *Quercus alba*, thus forming a compact woolly mass. A represents a single gall.

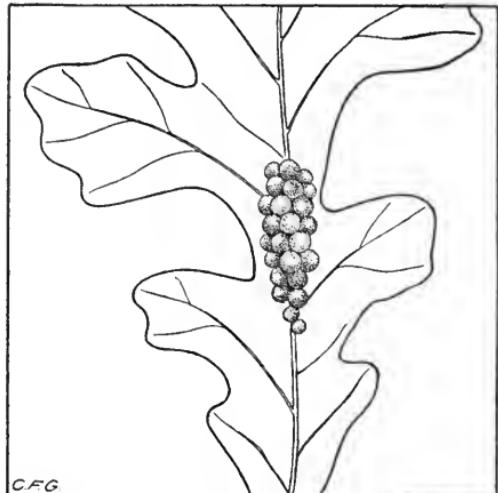
Color: white, often tinged red, turning brown.

**SMALL OAK APPLE***Andricus singularis* (Bass.)**GALL-WASP**

A small, smooth, thin-walled, globular gall occurring on the leaves of the red oak, *Quercus borealis* var. *maxima*.

It contains an oval larval cell suspended by radiating fibers. See A.

Color: green, turning brown.



CLUSTERED MIDRIB GALL

Cynips nigricens (Gill.)
GALL-WASP

A small spherical gall found on the under side of the leaves of the white oak, *Quercus alba*, and the burr oak, *Q. macrocarpa*. Occurs in clusters on the midrib.

Color: green, often tinged red, turning brown.

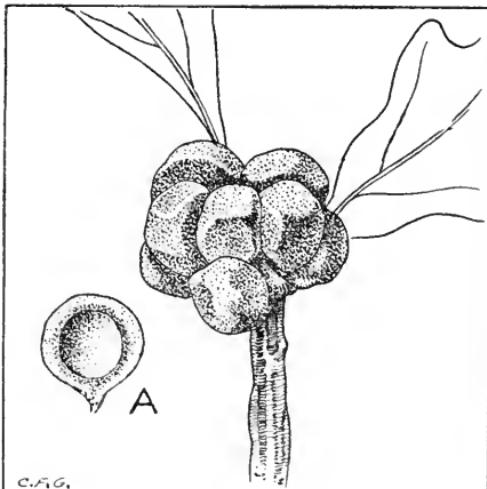
LOBED OAK GALL

Cynips strobilana (O. S.)
GALL-WASP

These angular, slightly wedge-shaped galls occur on the burr oak, *Quercus macrocarpa*, and the swamp white oak, *Q. bicolor*. Gall has a thick, corky wall.

Color: green, turning brown.

A: section of gall showing larval cell.

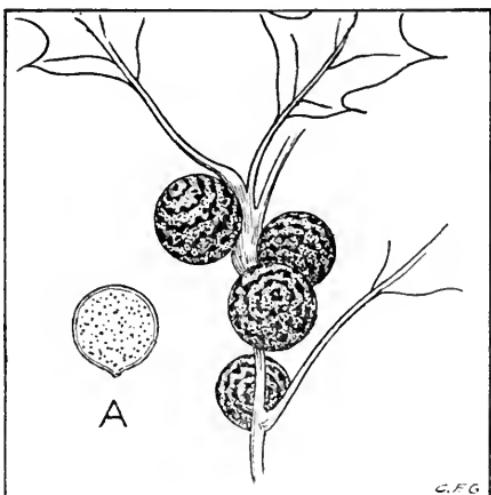


RED-BANDED BULLET GALL

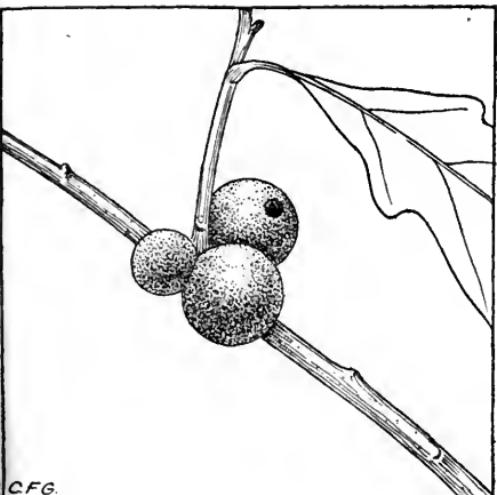
Dryocosmus imbricariae (Ashmd.)
GALL-WASP

This smooth, spherical gall, irregularly banded with red and green, is found on twigs of several species of the red oak group.

A shows section of gall.



C.F.G



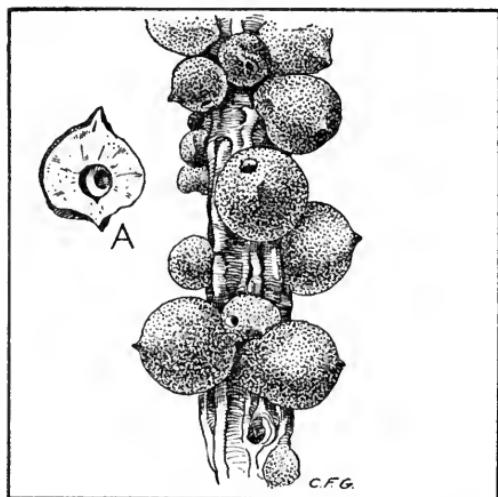
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OAK BULLET GALL

Disholcaspis globulus (Fitch)
GALL-WASP

This spherical, corky gall grows singly or in clusters on twigs of the white oak, *Quercus alba*. In the center of the gall is the small thin-walled larval cell.

Color: yellow, tinged red, turning brown.



ROUGH BULLET GALL

Disholcaspis mamma (Gill.)

GALL-WASP

This gall may be confused easily with the preceding. The distinguishing characters are a velvety surface and pointed apex. It usually occurs in large numbers and in variable sizes on the branches of the burr oak, *Quercus macrocarpa*.

Section of gall at A.

Color: green, turning brown.

WOOLLY LEAF GALL

Callirhytis lanata (Gill.)

GALL-WASP

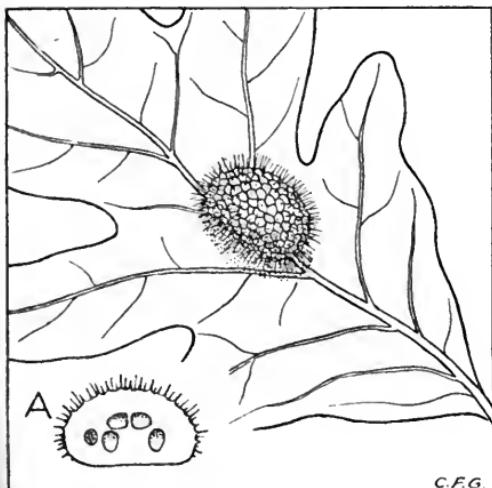
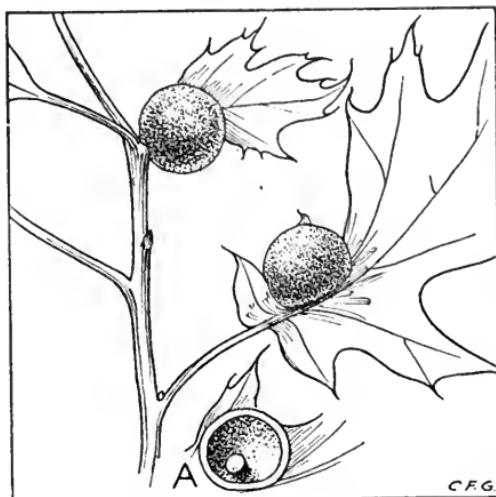
This gall, which occurs as a woolly mass on the under side of the leaves of several species of the red oak group, is composed of angular galls closely joined. When young the galls are covered with a whitish wool which later turns brown.



SUCCULENT OAK GALL*Dryophanta palustris* (O. S.)**GALL-WASP**

This hollow, globular gall is found on the leaves and catkins of several species of the red oak group. In the young galls the larval cell is attached to the inner surface of the gall. Later it becomes detached and rolls about freely. See A.

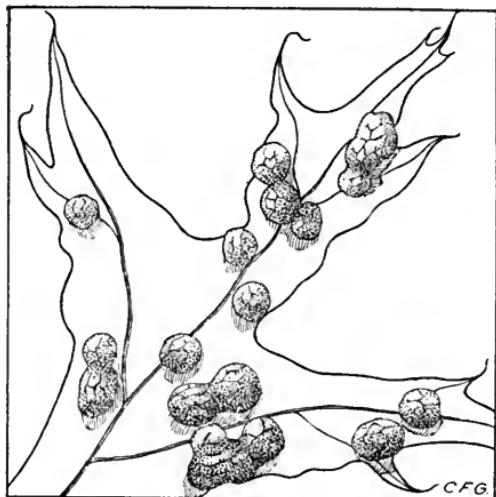
Color: green, often tinged red.

**OAK HEDGEHOG GALL***Acraspis erinacei* (Beutm.)**GALL-WASP**

A hard, round or elongated gall the surface of which is separated into small conical facets terminating in slender spines. Occurs on the midrib of the leaves of the white oak, *Quercus alba*.

Section of gall at A shows larval cells.

Color: yellow-green with red spines.



OAK PILL GALL

Cincticornia pilulae (Walsh)
MIDGE

A hard, subglobular gall often occurring in large numbers on the upper surface of the leaves of several species of the red oak group. Surface of gall has numerous fine fissures which later break open and become ragged.

Color: reddish.

MARGINAL FOLD GALL

Itonid foliora (Rssl. & Hkr.)
MIDGE

This gall is merely a folding of the leaf's edge over on the upper surface. Occurs on several species of the red oak group.

Color: like leaf, turning brown.



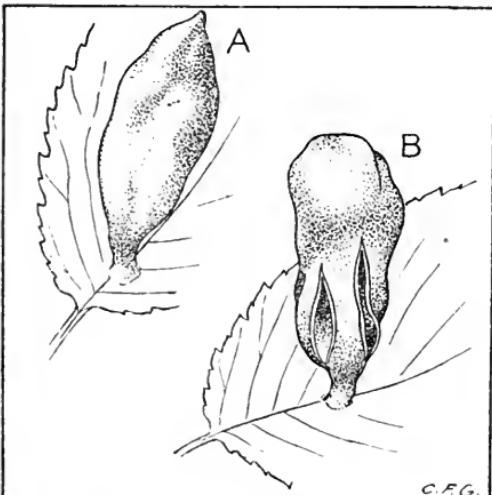
COCKSCOMB ELM GALL

Colopha ulmicola (Fitch)

PLANT LOUSE

This cockscomb-like gall is found on the upper surface of the leaves of the white elm, *Ulmus americana*. It is hollow with an opening on the under side as shown at A.

Color: green, often tinged red.



SLIPPERY ELM POUCH GALL

Pemphigus ulmifusus (Walsh)

PLANT LOUSE

A pouch-shaped gall occurring on the upper surface, usually near the midrib, on the leaves of the slippery elm, *Ulmus fulva*. Hollow, with opening on the under side. When mature, fissures occur at the base, thus providing additional exits for the insects.

Color: green, turning brown.



SPINY HACKBERRY GALL

Cecidomyia spiniformis (Patt.)
MIDGE

This small conical gall often occurs in large numbers on the under side of the leaves of the hackberry, *Celtis occidentalis*. Hollow and thin-walled.

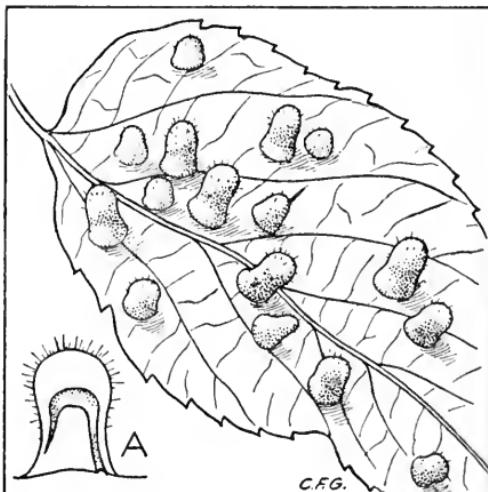
Color: yellow-green.

HACKBERRY NIPPLE GALL

Pachypsylla mamma (Riley)
JUMPING PLANT LOUSE

This subcylindrical gall occurs on the under side of the leaves of the hackberry, *Celtis occidentalis*. Lower half slightly constricted. Rounded, pubescent apex. Represented on upper side of leaf by shallow depression. Enlarged section of gall at A shows larval chamber and exit channel.

Color: pale blue-green.



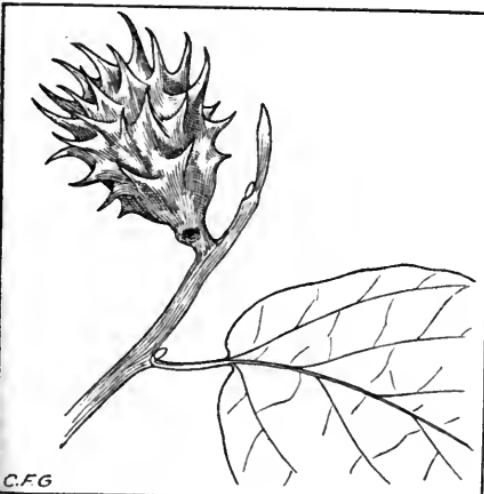
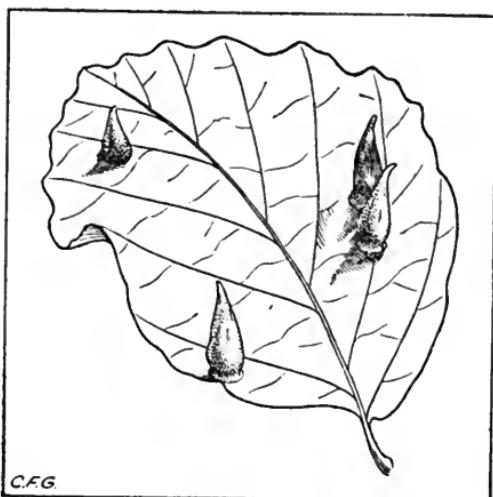
WITCH HAZEL CONE GALL

Hormaphis hamamelidis (Fitch)

PLANT LOUSE

This conical gall occurs on the upper surface of the witch hazel, *Hamamelis virginiana*. It is often slightly constricted at the base. The opening is on the under side.

Color: green, often tinged red.



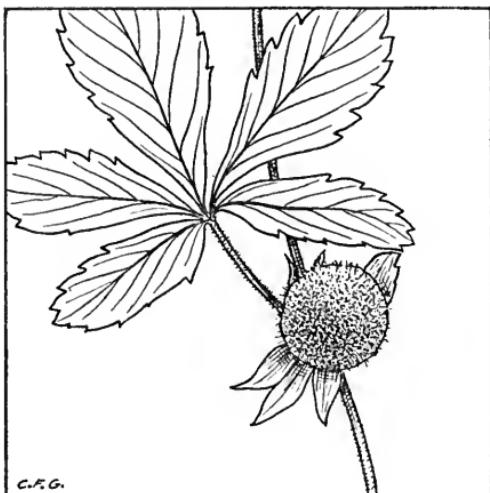
SPINY WITCH HAZEL GALL

Hormaphis spinosus (Shimer)

PLANT LOUSE

This gall, covered with numerous long spines, is a deformed fruit bud of the witch hazel, *Hamamelis virginiana*. It is hollow with an opening near the base.

Color: green.



CINQUEFOIL AXIL GALL

Gonaspis potentillae (Bass.)
GALL-WASP

This hairy, spherical gall occurs in the axils of the leaves of the cinquefoil, *Potentilla canadensis*, modified leaves often growing from it. Contains an oval larval cell.

Color: green, turning brown.

SPINY ROSE GALL

Rhodites pustulatoides (Beutm.)
GALL-WASP

This small, spiny gall occurs singly or in clusters on the leaves of some wild and cultivated roses.

Color: green, tinged red, turning brown.

A similar gall, *Rhodites bicolor* (Harr.), but larger and with long tapering spines, also is common. Occurs in clusters, often obliterating the leaf.

Color: same as preceding.



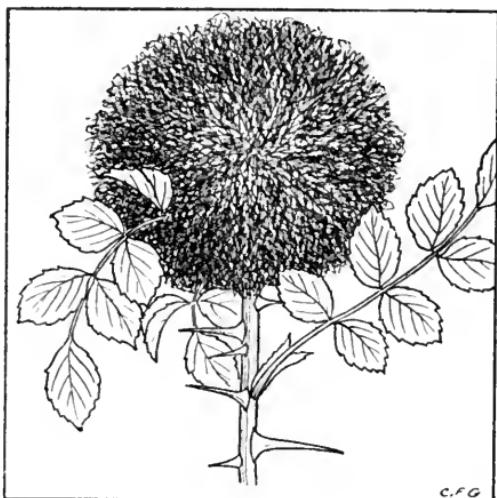
MOSSY ROSE GALL
ROSE BEDEGUAR

Rhodites rosae (Linn.)

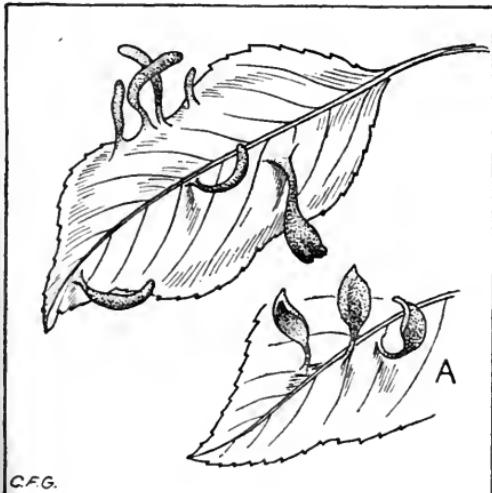
GALL-WASP

This gall consists of several larval cells covered with filaments which give it the moss-like appearance. Imported accidentally into this country. Found on the sweetbrier rose, *Rosa rubiginosa*.

Color: green, often tinged red, turning brown.



C.F.G.



C.F.G.

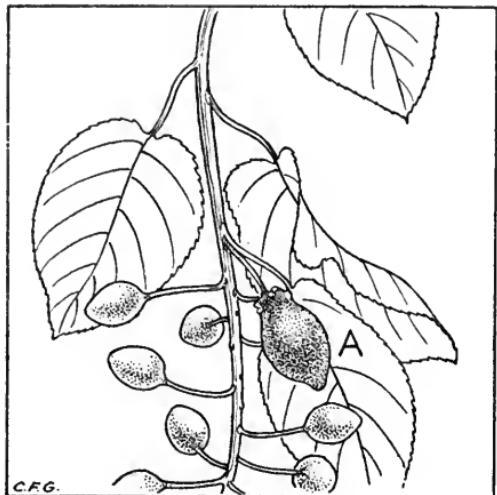
WILD CHERRY POUCH GALL

Eriophyes padi (Nal.)

MITE

This small pouch gall occurs on the upper surface of the leaves of the wild cherry, *Prunus serotina*. When mature a fissure occurs which gradually widens and lays the gall open as shown at A.

Color: green or red.



CHOKECHERRY POCKET GALL

Contarinia virginianiae (Felt)
MIDGE

This gall is a deformed fruit of the chokecherry, *Prunus virginiana*, which has become swollen and elongated. The cherry stone is absent in the gall. Gall is shown at A.

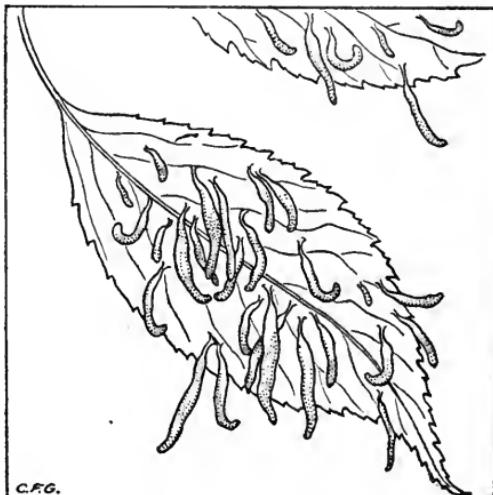
Color: green.

WILD PLUM POUCH GALL

Eriophyes sp.
MITE

This elongated, irregularly swollen pouch gall often occurs in large numbers on the under side of the leaves of the wild plum, *Prunus americana*.

Color: pale green, occasionally tinged red.



A**BOX ELDER LEAF
GALL***Contarinia negundifolia* (Felt)
MIDGE

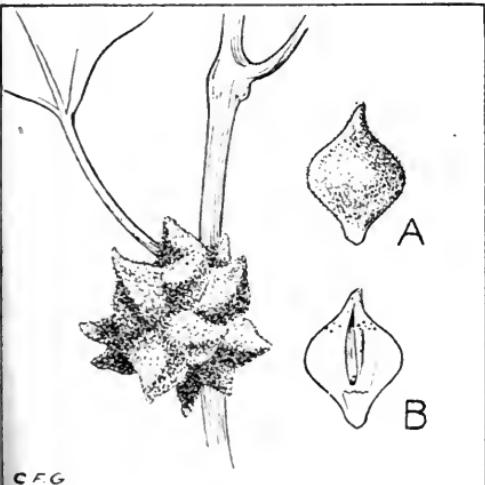
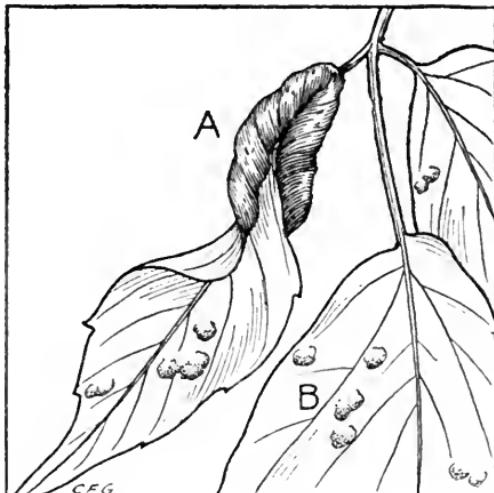
This gall is an elongated, succulent, rolled swelling of the leaf on both sides of the midrib.

Color: green.

B*Eriophyes negundi* (Hodgk.)
MITE

Small warty swellings irregularly scattered over the upper surface of the leaves.

Color: green.

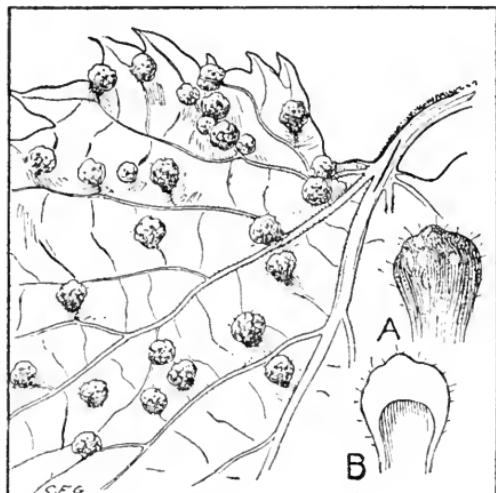
**GRAPE FILBERT GALL***Schizomyia coryloides* (Walsh)
MIDGE

This fusiform, hairy gall occurs in clusters on grapevines. Pithy inside with a long narrow larval cell.

A: single gall.

B: section of gall showing larval cell.

Color: green, turning brown.



**GRAPE
PHYLLOXERA GALL**
Phylloxera vitifoliae (Fitch)
 PLANT LOUSE

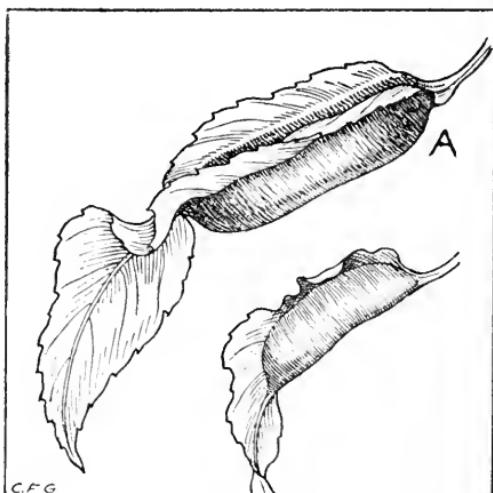
This wart-like gall is present in large numbers on the leaves of wild and cultivated grapes. Another generation of this insect, found on the roots, is very destructive.

A: an enlarged gall.
B: section of gall.
 Color: green.

ASH MIDRIB GALL
Contarinia canadensis (Felt)
 MIDGE

A rounded, elongated, succulent gall, occurring on the under side of the white ash, *Fraxinus americana*, leaves, involving midrib and part of leaf blade.

Color: green, often tinged red.

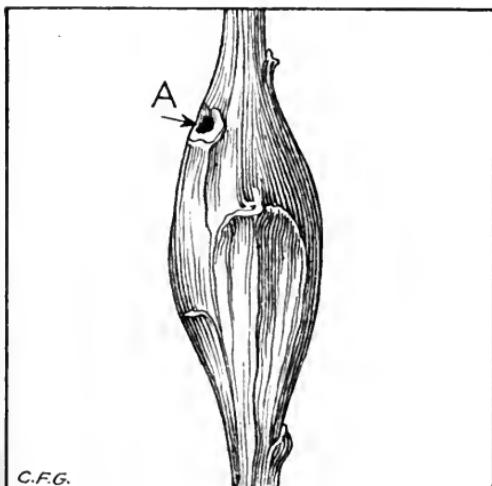


GOLDENROD BALL**GALL***Eurosta solidaginis* (Fitch)**GALL-FLY**

A pithy, globular stem gall with an oval larval cell in the center. Usually one on stem, occasionally two or more. Common on the goldenrod, *Solidago canadensis*.

Birds have been seen opening these galls to get the larvae.

Color: green.

**ELLIPTICAL****GOLDENROD GALL***Gnorimoschema gallaesolidaginis* (Riley)**GALL-MOTH**

A hollow, spindle-shaped gall common on the stem of the goldenrod, *Solidago canadensis*. Sometimes two or more on stem. Adult insect emerges through exit hole A previously prepared by the larva.

Color: green, tinged red.



GOLDENROD BUNCH GALL

Rhopalomyia solidaginis (Lw.)
MIDGE

A terminal gall arresting the growth of the stalk and causing the leaves to bunch together into a globular mass. The larval cell is at the end of the stalk in the center of this mass.

Color: green.

SUNFLOWER PURSE GALL

Asphondylia globulus (O. S.)
MIDGE

This globular stem gall is common on the wild sunflower, *Helianthus giganteus*. One or more on stem. The larval cells vary in number according to size of gall.

Color: green.



**APICAL SUNFLOWER
GALL**

Itonid sp.

MIDGE

This gall occurs terminally on the stem of the woodland sunflower, *Helianthus divaricatus*. A similar gall, caused by the midge *Asphondylia helianthiflorae* Felt, is found on *Helianthus strumosus*.

Color: green.



**APICAL ROSINWEED
GALL**

Aylax leavenworthi (Bass.)

GALL-WASP

This apical, subglobular gall is a deformation of the leaves and stem and occurs on the rosinweeds, *Silphium integrifolium* and *S. perfoliatum*. Illustration represents a gall on *S. perfoliatum*. It contains numerous larval cells.

Color: green.

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